Annual Index-Volume 49

LIST OF ISSUES IN VOLUME 49, January 1971 to December 1971

No. 1	January	Pages 1— 36
" 2	February	37— 68
" 3	March	69—100
" 4	April	101—132
" 5	May	133—164
" 6	June/July	165—196
" 7	August	197—228
" 8	September	229—260
" 9	October	261—296
" 10	November	297—328
" 11	December	329—364

A

ACCELERATED TESTING TECHNIQUES 305-309
ACD Will Serve Small Installations (New) 194
Active Filters: New Tools for Separating Frequencies (L. C. Thomas) 121-125
ADD-ON CONFERENCE 270-277
Advances in Radio Relay Design: The TH-3 Microwave Radio System (A. Hamori, R. C. Prime) 27-31
AIOD TRUNK TEST CIRCUIT 227
AIR POLLUTION (MEASURING) 224-225
ALUMINUM
  CABLE 2-12
  CONNECTOR 63
AMA Recorder Group Numbering Expanded 194
AMA TRUNKS IN NO. 5 CROSSBAR 163
AMERICAN NATIONAL STANDARD CODE FOR INFORMATION INTERCHANGE 203-208
Andres, R. R.
  Simulating the Ocean Environment 83-88
ANNOUNCEMENT FEATURES FOR NO. 5 CROSSBAR 130
Asbell, W. E.
  Sealed Contact Relays on Printed Wiring Boards 50-53
A-6 Channel Bank: Putting New Technologies to Work (G. W. Bleisch, W. P. Michaud) 251-254
Attendant Control of Facilities 356
Automated Trunk Testing System Field Tested in San Francisco 130
AUTOMATIC
  CALL DISTRIBUTOR 194
  DIALING 61
  DISCONNECT 22-26
  LINE BUILDOUT (DIGITAL COMMUNICATIONS) 109-114
  WAFER HANDLER 338-343
AUTOMATIC-RECOVERY (ESS) 176-179

B

BANDPASS FILTERS 185-190
BATTERIES (DISCHARGER-RECHARGER UNIT) 163
Battery Stand for New Bell System Battery 326
BEAM-LEAD INTEGRATED CIRCUITS 338-343
Bell Labs Engineers Develop Improved Speakerphone Set 226
Bell Labs Plan Analyzes Scope of White Page Directories 99
BELLFLOW DRAWS FLOW DIAGRAMS AUTOMATICALLY (W. G. Repsher) 209-215
BIQUADS 121-125
Bleisch, G. W.
  The A-6 Channel Bank: Putting New Technologies to Work 251-254
BOOKS BY BELL LABS AUTHORS (TWO NEW) 98
Bowers, K. D.
  Ultrasonics in Communications 139-145
Breakdown Test Set Designed 227
BRONZE RELAY SPRINGS 67

Annual Index-Volume 49

LIST OF ISSUES IN VOLUME 49, January 1971 to December 1971

No. 1	January	Pages 1— 36
" 2	February	37— 68
" 3	March	69—100
" 4	April	101—132
" 5	May	133—164
" 6	June/July	165—196
" 7	August	197—228
" 8	September	229—260
" 9	October	261—296
" 10	November	297—328
" 11	December	329—364

A

ACCELERATED TESTING TECHNIQUES 305-309
ACD Will Serve Small Installations (New) 194
Active Filters: New Tools for Separating Frequencies (L. C. Thomas) 121-125
ADD-ON CONFERENCE 270-277
Advances in Radio Relay Design: The TH-3 Microwave Radio System (A. Hamori, R. C. Prime) 27-31
AIOD TRUNK TEST CIRCUIT 227
AIR POLLUTION (MEASURING) 224-225
ALUMINUM
  CABLE 2-12
  CONNECTOR 63
AMA Recorder Group Numbering Expanded 194
AMA TRUNKS IN NO. 5 CROSSBAR 163
AMERICAN NATIONAL STANDARD CODE FOR INFORMATION INTERCHANGE 203-208
Andres, R. R.
  Simulating the Ocean Environment 83-88
ANNOUNCEMENT FEATURES FOR NO. 5 CROSSBAR 130
Asbell, W. E.
  Sealed Contact Relays on Printed Wiring Boards 50-53
A-6 Channel Bank: Putting New Technologies to Work (G. W. Bleisch, W. P. Michaud) 251-254
Attendant Control of Facilities 356
Automated Trunk Testing System Field Tested in San Francisco 130
AUTOMATIC
  CALL DISTRIBUTOR 194
  DIALING 61
  DISCONNECT 22-26
  LINE BUILDOUT (DIGITAL COMMUNICATIONS) 109-114
  WAFER HANDLER 338-343
AUTOMATIC-RECOVERY (ESS) 176-179

B

BANDPASS FILTERS 185-190
BATTERIES (DISCHARGER-RECHARGER UNIT) 163
Battery Stand for New Bell System Battery 326
BEAM-LEAD INTEGRATED CIRCUITS 338-343
Bell Labs Engineers Develop Improved Speakerphone Set 226
Bell Labs Plan Analyzes Scope of White Page Directories 99
BELLFLOW DRAWS FLOW DIAGRAMS AUTOMATICALLY (W. G. Repsher) 209-215
BIQUADS 121-125
Bleisch, G. W.
  The A-6 Channel Bank: Putting New Technologies to Work 251-254
BOOKS BY BELL LABS AUTHORS (TWO NEW) 98
Bowers, K. D.
  Ultrasonics in Communications 139-145
Breakdown Test Set Designed 227
BRONZE RELAY SPRINGS 67

BUBBLES (MATERIALS FOR MAGNETIC) 238-243
BURIED CABLE 2-12, 13-21
BUSINESS INFORMATION SYSTEM PROGRAMS 2-12, 43-49, 67, 89-96, 349-353

C

CABLE
ALUMINUM 2-12
BURIED 2-12, 13-21
FOR T-2 TRANSMISSION SYSTEM (IMPROVED) 292
SPLICES 163
Caffrey, R. E.
Using Chemical Vapor Deposition to Make Dielectric Thin Films 38-42
CALL HANDLING (No. 1 ESS) 171-173, 174-175
CALL-PROCESSING 174-175
Call-Waiting Service for No. 5 Crossbar 67
Caputo, S.
New Test Set Expedites Testing of Voiceband Data Systems 285-290
CARDS AND CARD DIALER TELEPHONES 61, 344-348
Carlson, D. E.
New Selective-Calling Stations for Low-Speed Private Line Data Service 203-208
Carlson, R. G.
New Switching Concept for Multilocation Customers 230-237
CAROT 2-12, 130
Carroll, J. D.
Measuring Preference and Perception With Multidimensional Models 146-154
Catterall, J. M.
Uses for the New Small Crossbar Switch 216-221
CCD's Used in Linear Imaging Device 127
CENTRAL OFFICE INSTALLATIONS, MAINTENANCE 99
CENTREX
CUSTOMERS (TOUCH-TONE® DIALING FOR) 295
SYSTEM 230-237
TIE LINES FOR ESS 227
CERAMIC NOZZLE DEVELOPED 34
Chadda, R. L.
Statistical Forecasting in the Bell System 349-353
CHANNEL BANK (A-6) 251-254
CHARGE-COUPLED DEVICES 127
CHEMICAL VAPOR DEPOSITION TO MAKE DIELECTRIC THIN FILMS 38-42
Chin, G. Y.
Textured Materials 70-76
CIRCULAR WAVEGUIDE (ON-SITE BENDING) 180-184
CIRCULATORS (STRIPLINE) 27-31
CLOCKS 310-315
CLOSURE (CABLE SPLICES) 163
COEES 349-353
COIN
SERVICE IMPROVEMENT PROGRAM 227
STATION TEST LINE 67
Colton, J. R.
A Versatile New Test for Signaling Systems 115-120
Computer Cubisms 61
COMPUTER
CODES 43-49
GRAPHICS 256
MODELS 77-81, 343-353
COMPUTER PHOTOTYPESETTING AND COMPOSING 67, 89-96
COMPUTER PROGRAM DOCUMENTATION 209-215
COMPUTER-SPOKEN SYNTHETIC SPEECH 32
COMPUTERS IN SELECTING SWITCHING SYSTEMS 54-58
CONFERENCING 127, 226, 270-277
CONNECTOR (ALUMINUM) 63
COPPER RECLAMATION (SCRAP) 34
COUNT MATRICES 349-353
CREDIT CARDS AND CARD DIALER TELEPHONES 61
CROSS-SECTIONAL DATA 349-353
CROSSBAR No. 5 67, 130, 163, 216-221, 295
CROSSBAR SWITCHES 194, 216-221
CROSSBAR TANDEM OFFICES 194, 227
CRYSTAL
FILTERS (MONOLITHIC) 251-254
GROWTH 238-243
LATTICES 70-76
RESONATORS (QUARTZ) 139-145
Cunningham, P. B.
A New T-1 Regenerative Repeater 109-114

D

Daskalakis, A.
Key Systems for Picturephone® Service 270-277
DATA
COMMUNICATIONS 2-12, 102-108, 109-114, 130, 162, 194, 203-208, 244-250, 278-284, 285-290, 295, 310-315, 344-348
CROSS-SECTIONAL 349-353
DISPLAY 295
ENTRY DEVICES 344-348
DATA-PHONE® SERVICE 278-284
DDD TRANSMISSION PREDICTED BY COMPUTER MODELS 77-81
DEBUGGING 316-321
Delatore, J. P.
Solving Software Problems in TSPS No. 1 316-231
DELAY
EQUALIZERS 27-31, 185-190
LINES 139-145
Designing Human-Oriented Codes (L. Sonntag) 43-49
DESK-TOP CONSOLES 22-26
DIAL LONG LINE UNIT FOR PREPAYMENT COIN LINES 227
"Dial-A-Test" for Public Telephone Repairmen 161
DIALING
AMBIGUITY (No. 1 ESS) 326
FOR CENTREX CUSTOMERS 295
VOICE-CONTROLLED 294
DIELECTRIC THIN FILMS 38-42
Digital Communications—A Tutorial (K. G. McKay) 278-284
DIGITAL
MODULATION 330-337
MULTIPLEX CIRCUITS 198-202
READOUT 338-343
SYSTEMS 2-12, 102-108, 162, 278-284, 310-315
DIPLEXERS 185-190
DIR/ECT: A Revolution in Directory Production (B. R. Jansson) 89-96
DIR/ECT Goes to Work 67
DIRECT DISTANCE DIALING 2-12, 77-81, 163, 171-173, 174-175, 295, 326
DIRECTORY
PRODUCTION 67, 89-96
SCOPE ANALYSIS PROGRAM 99
Discharger-Recharger Unit Permits More Convenient Testing of Batteries 163
DISPLAYS 295, 324, 326
DISTRIBUTION PLANT 2-12
Donohoe, D. C.
A Versatile New Test Set for Signaling Systems 115-120
Drazy, E. J.
Recent Developments in Microwave Networks 185-190
DRY-REED SEALED CONTACTS 50-53
DUMPSTORE 316-321
Durand, D. L.
A New T-1 Regenerative Repeater 109-114
Dynamic Testing of Integrated Circuits (B. H. McGahey, E. W. Thomas) 338-343

E

EAR (MODELING) 66
EARTH'S MAGNETIC FIELD (MEASURING VARIATIONS IN) 192-193
Echo Suppression for Private-Service Lines 326

ELECTRIC BIASING AND HIGH-TEMPERATURE TESTING 305-309
ELECTRICAL CONTACTS 50-53, 155-159
ELECTRONIC
PBX FOR BASIC DIAL SERVICE 130
TELEPHONE-SWITCHING SYSTEMS 2-12, 166-170, 171-173, 174-175, 176-179, 258, 316-321, 326
Emergency Action for No. 1 ESS (J. S. Novak) 176-179
Equalizer for V4 Repeater 356
EQUALIZERS (DELAY) 27-31
Eubank, C. H.
Programmed One-Number Telephones Place Calls Automatically 134-138
Evolution of Wideband Data Services (H. Kahl) 244-250
EXPANDED MAIN/SATELLITE SERVICE 230-237
E2 SYSTEM 163

F

FACSIMILE REPRODUCTION 310-315
FIBER-OPTICS 330-337
FILTERS (ACTIVE) 121-125
FLOW DIAGRAMS (BELLFLOW) 209-215
FM TRANSMITTER 27-31, 102-108, 326
FORECAST OF TELEPHONE PLANT OF THE 1970's 2-12
FORECASTING 54-58, 130, 349-353
Fracassi, R. D.
Megabit Data Service with the 306A Data Set 310-315
Friis, H. T. 98

G

GAIN-SWITCHING EQUIPMENT 326
GARNETS (RARE EARTH) 238-243
Geigel, A.
Monitoring the Performance of Digital Multiplex Circuits 198-202
GENERIC PROGRAMS 174-175, 326
GLASS FIBERS 330-337
GO/NO GO PAIR TESTER 99

H

Halvorsen, H. J.
A Versatile New Test Set for Signaling Systems 115-120
Hamori, A.
Advances in Radio Relay Design: The TH-3 Microwave Radio System 27-31
HANDWRITING OVER TELEPHONE NETWORK 324
Hauser, V. E.
Using Chemical Vapor Deposition to Make Dielectric Thin Films 38-42
HEADSETS (TELEPHONE) 194
HEARING RESEARCH 66
Heick, R. B.
A Versatile New Test Set for Signaling Systems 115-120
HETEROJUNCTION LASERS 298-304
HETEROSTRUCTURE INJECTION LASERS 298-304, 330-337
HIGH-TEMPERATURE TESTING 305-309
HIGH-ENERGY ELECTRON IRRADIATION 130
HIGH-SPEED DATA SERVICE 102-108, 130, 194, 244-250, 278-284
Hinck, L. R.
Solving Software Problems in TSPS No. 1 316-321
HOLOGRAPHIC MEMORIES 262-269
Hotel/Motel Service 67
Human Factors in Touch-Tone® Data Systems (G. K. Mahood) 344-348
HUMAN-ORIENTED CODES 43-49
HYDROSTATIC TEST CHAMBER 83-88

I

IMAGING DEVICE 127
IMPATT DIODES 64-65
INCOMING CALL IDENTIFICATION DISPLAY 326
INDSCAL 146-154
INJECTION LASERS (HETEROSTRUCTURE) 298-304
INSULATION (WIRE) 130
INTEGRATED
CIRCUITS (DYNAMIC TESTING OF) 338-343
OPERATIONAL AMPLIFIERS 121-125
INTERCOM FOR PICTUREPHONE® SERVICE 194, 270-277
IONIC CONTAMINATION 38-42
IONOSPHERIC RADIO REFLECTION 192-193

J

Jacisin, J. M.
Simulating the Ocean Environment 83-88
Jansson, B. R.
DIR/ECT: A Revolution in Directory Production 89-96
Johannesen, J. D.
What's New in No. 1 ESS 166-170

K

Kahl, H.
Evolution in Wideband Data Service 244-250
Key Systems for Picturephone® Service (A. Daskalakis) 270-277
Kindermann, W. J.
On-Site Bending of Rigid Circular Waveguide 180-184
Knab, E. D.
On-Site Bending of Rigid Circular Waveguide 180-184

L

L-4 2-12
L-5 2-12
Laser Lifts Tiny Glass Spheres 325
LASERS 2-12, 224-225, 262-269, 298-304, 325, 330-337
Laudise, R. A.
Materials for Magnetic Bubbles 238-243
Lee, R. C.
Streamlined Programs and Expanded Use of Memories Boost No. 1 ESS Capacity 174-175
LEVITATION (OPTICAL) 325
Li, T.
Research on Optical-Fiber Transmission 330-337
LIGHT TRANSMISSION 330-337
LINEAR IMAGING DEVICE 127
Liss, W. A.
Service Link Network Simplifies No. 1 ESS Call-Handling 171-173
Load Control and Network Protection in No. 1 ESS 356
LOCAL EXCHANGE AREA PLANNING SIMULATION 54-58
Lombardi, J. A.
A New T-1 Regenerative Repeater 109-114

M

MAGNETIC BUBBLE
DEVICES 33
MATERIALS 238-243
Mahood, G. K.
Human Factors in Touch-Tone® Data Systems 344-348
MAIN/SATELLITE TELEPHONE SERVICE 230-237
MANHOLE 67
Marcatili, A. J.
Research on Optical-Fiber Transmission 330-337
Marek, J. J.
A Small PBX for the Small Business 22-26

Marker Speedup for No. 1 Crossbar 99
McGahey, B. H.
Dynamic Testing of Integrated Circuits 338-343
McKay, K. G.
Digital Communications—A Tutorial 278-284
Measuring Air Pollution 224-225
Measuring Preference and Perception with Multidimensional Models (J. D. Carroll, M. Wish) 146-154
Measuring Variations in the Earth's Magnetic Field 192-193
MECHANICAL MOLES 13-21
Megabit Data Service With the 306A Data Set (R. D. Fracassi, T. Tammaru) 310-315
MEMORIES 174-175, 238-243, 316-321
MF RECEIVER FOR ELECTROMECHANICAL OFFICES 163
Michaud, W. P.
The A-6 Channel Bank: Putting New Technologies to Work 251-254
MICROWAVE
NETWORKS 185-190
RADIO RELAY SYSTEM 27-31, 102-108
MMX-2 MULTIPLEX 258
MOBILE COMMUNICATIONS 2-12
MODELING
TECHNIQUES 256
THE EAR 66
MODULATION (DIGITAL) 278-284, 330-337
Molnar, J. P.
The Telephone Plants of the 1970's 2-12
Monitoring the Performance of Digital Multiplex Circuits (A. A. Geigel) 198-202
MONOLITHIC CRYSTAL FILTERS 139-145, 251-254
Morton, J. A. 98
MULDEM 198-202
MULTIDEVICE OSCILLATORS 64-65
MULTIDIMENSIONAL SCALING 146-154
MULTIGROUP LINE SERVICE 270-277
MULTILINK INTERCOM FOR PICTUREPHONE® SERVICE 194, 270-277
MULTIPLEX CIRCUITS 198-202
MULTIPLEXING 278-284

N

NETWORK MANAGEMENT 163
NETWORK PROTECTION IN No. 1 ESS 356
New Ceramic Nozzle Developed 34
New "Credit-Size" Cards and Card Dialer Telephones for Automatic Dialing 61
New Aluminum Connector Saves Time 63
New Storage Battery Developed 67
New Developments Streamline Central Office Installations, Maintenance 99
New Technique Aids in Forecasting Service Demands 130
New Electronic PBX for Basic Dial Service 130
New Wire Insulation May Reduce Cost, Flammability of Switching Office Wire 130
New Announcement System Features for No. 5 Crossbar 130
New Data Set Developed for Picturephone® Service 130
New MF Receiver for Electromechanical Office 163
New Feature for E2 System Permits Use for Network Management Applications 163
New Headsets Designed 194
New Data Set Provides High-Speed Data Services 194
New Plug Allows Access to Small Crossbar Switches 194
New ACD Will Serve Small Installations 194
New Selective-Calling Stations for Low-Speed Private-Line Data Service (D. E. Carlson, C. J. Votaw) 203-208
New Dial Long Line Unit for Prepayment Coin Lines 227
New Switching Concept for Multilocation Customers (R. G. Carlson, N. D. Weber, R. B. Wolf) 230-237
New Three-Dimensional Modeling Techniques 256
New PBX Fill Wide Range of Customer Traffic Requirements 258
New Test Set Expedites Testing of Voiceband Data Systems (S. Caputo) 285-290
New Look in Operator Chairs 293
New Voiceband Data Auxiliary Set 295
New Features for 757A PBX 326
914B Data Test Set 285-290
NITROGEN OXIDE 224-225
No. 1 CROSSBAR 99
No. 1 ESS 166-170, 171-173, 174-175, 176-179, 326, 356
No. 1 TSPS 316-321
No. 4 ESS 2-12
No. 5 CROSSBAR 67, 130, 163, 216-221, 295
NOISE IN TJ RECEIVERS 356
Nowak, J. S.
Emergency Action for No. 1 ESS 176-179

O

OCEAN ENVIRONMENT 83-88
On-Site Bending of Rigid Circular Waveguide (W. J. Kindermann, E. D. Knab) 180-184
ONE-NUMBER TELEPHONES 134-138
OPERATOR CHAIRS 293
OPTICAL
BOTTLE 325
COMMUNICATIONS 262-269, 330-337
LEVITATION 325
OPTICAL-FIBER TRANSMISSION 262-259, 330-337
OSCILLATORS (MULTIDEVICE) 64-65
OSCILLOSCOPE WITH DIGITAL READOUT (SAMPLING) 338-343

P

PAIR TESTER (GO/NO GO) 99
Panish, M. B.
Heterostructure Injection Lasers 298-304
Party Line for ESS 258
PBX 22-26, 99, 130, 258, 326
Peck, D. S.
Testing Techniques That Assure Reliable Semiconductor Devices 305-309
PERCEPTION AND PREFERENCE (MEASURING) 146-154
Petschenik, N. H.
Solving Software Problems in No. 1 TSPS 316-321
PHASE JITTER 198-202
PHYSICAL STIMULI (PSYCHOLOGICAL REACTIONS TO) 146-154
PICTUREPHONE® SERVICE 2-12, 127, 130, 194, 270-277, 295
PIEZOELECTRIC TRANSDUCERS 139-145
Pinpointing Circuit Trouble 227
PLASTIC BATTERY STAND 326
Plastic Replaces Cast Iron in Closures to Protect Cable Splices 163
POLYVINYL CHLORIDE (INSULATION) 130
POWER PLANTS FOR DIAL AND BUSY TONES 163
PREDICTING GROWTH 349-353
PREPAYMENT COIN LINES 227
PRESET-DIAL TELEPHONES 134-138
Prime, R. C.
Advances in Radio Relay Design: The TH-3 Microwave Radio System 27-31
PRINTED WIRING BOARDS 50-53, 115-120
PRIVATE LINE DATA SERVICE 203-208
PROBE FOR TESTING INTEGRATED CIRCUITS 338-343
Programmed One-Number Telephones Place Calls Automatically (C. H. Eubank) 134-138
PROGRAMMING 43-49, 54-58, 67, 77-81, 89-96, 174-175, 209-215, 316-321, 326
PROGRAMS (TSPAK) 349-353
PSYCHOLOGICAL REACTIONS TO PHYSICAL STIMULI 146-154

Public Telephone Provides Convenience for the Handicapped 62
PULSE
CODE MODULATION 102-108
STUFFING 198-202
Putting Telephone Lines Below Ground (A. G. Vedejs) 13-21

Q

QUARTZ CRYSTAL RESONATORS 139-145

R

RADIATION PRESSURE 325
RADIO
REFLECTION (IONOSPHERIC) 192-193
RELAY SYSTEM 27-31, 102-108
RAMAN LASERS 224-225
RARE EARTH GARNETS 238-143
REAL-TIME DISPLAYS 324
RECEIVERS 108-108, 163, 356
RECLAMATION (SCRAP COPPER) 34
RECORDER GROUP NUMBERING EXPANDED (AMA) 194
Reed, E. D.
Lasers in the Bell System 262-269
REED SEALED CONTACTS (DRY) 50-53
REG 326
REGENERATIVE REPEATER (T-1) 109-114
Rehert, A. F.
Using Computers in Selecting New Switching Systems 54-58
RELIABILITY (IN SEMICONDUCTORS) 305-309
Reliability of T-1 Carrier Power Equipment Improved 258
"Remote Blackboard" Transmits Handwriting Over Telephone Network 329
REMOTE TESTING 258
REPEATERS 109-114, 356
Repsher, W. G.
BELLFLOW Draws Flow Diagrams Automatically 209-215
RESONATORS (QUARTZ CRYSTAL) 139-145
RINGING CONNECTIONS 171-173
ROD-PLACE UNIT 67
ROOM-TEMPERATURE LASER 298-304, 330-337

S

SCANNING ELECTRON MICROSCOPES 155-159
SCRAP COPPER RECLAMATION 34
SEALED CONTACT RELAYS 50-53
SELECTIVE-CALLING STATIONS 203-208
SEMICONDUCTOR
DEVICES 64-65, 305-309
LASERS 262-268, 298-304
Service Link Network Simplifies No. 1 ESS Call Handling (W. A. Liss) 171-173
757A PBX (NEW FEATURES) 326
SIGNAL REGENERATORS 292
SIGNALING
LANGUAGES 115-120
OVER CENTREX TIE LINES FOR ESS 227
TEST SET 115-120
SILICON
IMAGING DEVICES 127
INTEGRATED CIRCUITS 109-114, 338-343
NITRIDE 38-42
TRANSISTORS 258
Simulating the Ocean Environment (J. M. Jacisin, R. R. Andres) 83-88
SINGLE-GROUP LINE SERVICE 270-277
SINGLE-LINK INTERCOM 270-277
SLIDING INDEX CODING 244-250
Smith, F. H.
Uses for the New Small Crossbar Switch 216-221
SOFTWARE PROBLEMS 316-321
Solving Software Problems in TSPS No. 1 (J. P. Delatore, L. R. Hinck, N. H. Petschenik) 316-321
Sonntag, L.
Designing Human-Oriented Codes 43-49
Spang, T. C.
DDD Transmission Predicted by Computer Models 77-81
SPEAKERPHONE SET 226
Speech "Tailored" for Talking Computers 32
SPRINGS (RELAY) 67
Squelch Capability Added to MMX-2 Multiplex 258
Staehler, R. E.
What's New in No. 1 ESS 166-170
Statistical Forecasting in the Bell System (R. L. Chaddha) 349-353
STATLIB 349-353
STEP-BY-STEP OFFICES (REMOTE TESTING) 258
STEREO PHOTOGRAPHY 155-159
STORAGE BATTERY 67
STORED-PROGRAM SWITCHING 2-12
Streamlined Programs and Expanded Use of Memories Boost No. 1 ESS Capacity (R. C. Lee) 174-175
STRIPLINE CIRCULATORS 27-31
Surge Tests for PBX Circuits 99
SWIFT 349-353
SWITCH (SMALL CROSSBAR) 216-221
SWITCHED MAINTENANCE ACCESS SYSTEM 227
SWITCHING
FOR MULTILOCATION CUSTOMERS 230-237
FOR BUSINESS CUSTOMERS (PICTUREPHONE® SERVICE) 127
SYSTEMS (SELECTING NEW) 54-58
SYNTHETIC SPEECH (COMPUTER-SPOKEN) 32

T

T-1 CARRIER SYSTEM 2-12, 244-250, 278-284, 310-315
T-1 POWER EQUIPMENT 258
T-1 REGENERATIVE REPEATER 109-114
T-2 Begins Field Trial 99
T-2 Digital Transmission System Developed by Bell Laboratories 162
T-2 TRANSMISSION SYSTEM 2-12, 292
TALKING COMPUTERS 32
Tammaru, T.
Megabit Data Service with the 306A Data Set 310-315
Tarbox, R. A.
A New T-1 Regenerative Repeater 109-114
TD-2 MICROWAVE RADIO RELAY SYSTEM 102-108
Telephone Plant of the 1970's (J. P. Molnar) 2-12
TELEPHONE CABLES (BURIED) 13-21
TELEPHONES
FOR AUTOMATIC DIALING 61
PLACE CALLS AUTOMATICALLY 134-138
TELETYPEWRITERS 203-208
TEMPERATURE CYCLING 305-309
TEST SETS
VOICEBAND DATA SYSTEMS 285-290
FOR SIGNALING SYSTEMS 114-120
914B 285-290
TESTING
DEVICES (PUBLIC TELEPHONES) 164
INTEGRATED CIRCUITS 338-343
OF BATTERIES 163
OF VOICEBAND DATA SYSTEMS 285-290
(AUTOMATED TRUNK) 130
TECHNIQUES (SEMICONDUCTOR DEVICES) 305-309
Textured Materials (G. Y. Chin) 70-76
TH-3 MICROWAVE RADIO SYSTEM 27-31
THIN FILMS (CHEMICAL VAPOR DEPOSITION) 38-42
Thomas, E. W.
Dynamic Testing of Integrated Circuits 338-343

Thomas, L. C.
Active Filters: New Tools for Separating Frequencies 121-125
Thompson, M. J.
Transmitting Digital Signals on Analog Radio Links 102-108
THREE-DIMENSIONAL MODELING TECHNIQUES 256
306A DATA SET 310-315
TIME SERIES DATA 349-353
TJ RECEIVERS 356
TOLL SWITCHING 2-12
TOUCH-TONE® DATA SYSTEMS 344-348
Touch-Tone® Dialing for Centrex Customers 295
Touch-Tone® Signaling Over Centrex Tie Lines for ESS 227
Traffic Data Recorder for Crossbar Tandem Offices 194
TRANSDUCERS (PIEZOELECTRIC) 139-145
TRANSFER-TRACE SYSTEM 316-321
TRANSMISSION
(LIGHT, RESEARCH ON OPTICAL FIBER) 330-337
PREDICTIONS (COMPUTER MODELS) 77-81
TRANSMITTER (FM) 326
Transmitting Digital Signals on Analog Radio Links (M. J. Thompson) 102-108
Trunk Testing for Crossbar Tandem Offices 227
TRUNK TESTING SYSTEM (AUTOMATED) 130
TRUNKS (REMOTE TESTING) 258
TSPS 295, 316-321
TSPAK PROGRAMS 349-353

U

Ultrasonics in Communications (K. D. Bowers) 139-145
Unrestricted Assignment of AMA Trunks in No. 5 Crossbar 163

V

Van Uitert, L. G.
Materials for Magnetic Bubbles 238-243
VAPOR DEPOSITION (DIELECTRIC THIN FILMS) 38-42
Vedejs, A. G.
Putting Telephone Lines Below Ground 13-21
VIBRATING PLOWS 13-21
VIDEO CONFERENCING 127, 270-277
VOICE-CONTROLLED DIALING 294
VOICE-CONTROLED SWITCHING 226
VOICE-FREQUENCY GAIN (RANGE EXTENDER) 326
VOICE-RESPONSE UNIT 344-348
VOICEBAND
DATA AUXILIARY SET 295
DATA SYSTEMS TESTING 285-290
Votaw, C. J.
New Selective-Calling Stations for Low-Speed Private Line Data Service 203-208
V4 REPEATER 356

W

WAVEGUIDE BENDING 180-184
Weber, N. D.
New Switching Concept for Multilocation Customers 230-237
What's New in No. 1 ESS (Johannesen, J. D., Staehler, R. E.) 166-170
WHITE PAGE DIRECTORIES (SCOPE) 99
WIDEBAND
DATA SERVICES (EVOLUTION OF) 244-250
DATA STATIONS 295
Winquist, N. H.
Using Scanning Electron Microscopes to Uncover Contact Problems 155-159
WIRE INSULATION 130
WIRE-SPRING RELAYS 295
Wish, M.
Measuring Preference and Perception with Multidimensional Models 146-154
Wolf, R. B.
New Switching Concept for Multilocation Customers 230-237
WOOD POLES AND STUBS (TREATING) 258

Z

Zierdt, C. H.
Testing Techniques That Assure Reliable Semiconductors 305-309